DECLARATION FOR THE NEAL'S LANDFILL RECORD OF DECISION AMENDMENT

SITE NAME AND LOCATION

The Neal's Landfill site is located in Bloomington, Indiana. The National Superfund Database identification number is IND980614556. This Record of Decision (ROD) Amendment addresses contaminated water and sediment, and in this ROD Amendment are referred to as Operable Unit 2 and Operable Unit 3, respectively.

STATEMENT AND BASIS AND PURPOSE

This decision document presents the Selected Remedy for the Neal's Landfill site, located in Bloomington, Indiana. This ROD amendment presents the remedial action selected in accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This ROD Amendment will become part of the Administrative Record file per Section 300.825(a)(2) of the NCP. The Administrative Record which contains the information on which selection of the remedial action was based, is available for review at the Monroe County Public Library in Bloomington, Indiana, as well as at the United States Environmental Protection Agency, Region 5, Superfund Records Center.

ASSESSMENT OF SITE

The response actions selected in the ROD amendment are necessary to protect the public health or welfare or the environment from actual or threatened release of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy for the Neal's Landfill site addresses groundwater and sediment contaminated by PCBs from springs on the Neal's Landfill site. The source control operable unit (operable unit 1) was completed in 1999 and addressed the principle threat waste through the excavation and off-site disposal and off-site incineration of high concentrations of PCB waste, including capacitors containing PCBs. The Selected Remedy consists of improving the spring water collection system and performing a sediment cleanup in Conard's Branch. The major components of the groundwater and sediment operable units consist of the following:

- Improvement of the spring water collection system to capture PCB-contaminated groundwater seeps which currently bypass the current collection system.
- Install a new effluent line farther downstream in Conard's Branch for discharging water treated by the water treatment plant. This will prevent treated water from being collected by the new spring water collection system.

- Continue to operate the 450 gallons per minute (gpm) water treatment plant, which is capable of treating up to 500 gpm. The water treatment plant will meet a revised PCB effluent standard of 0.3 parts per billion (ppb). A revised Operation and Maintenance Plan will also be implemented for the water treatment plant.
- Implement a soil and sediment cleanup for in-stream sediments, bank soils and floodplain soils in Conard's Branch. The cleanup criteria is 1 parts per million (ppm) on average for PCBs located in-stream sediments and bank soils and 5 ppm on average for floodplain soils. The estimated volume of contaminated soils and sediment is 1,141 cubic yards and this material will be disposed of off-site in a permitted landfill. The improvements to the spring water collection system for the 450 gallons per minute treatment plant and the sediment and soils cleanup are expected to reduce the PCB levels in fish tissue to acceptable levels within 10 years, based upon a fate and transport model.
- Implement institutional controls to prevent residential and commercial development for the 10-acre landfill cap, prevent residential development in the southeast portion of the site, prevent residential development and certain farming activities within the floodplain area of Conard's Branch and prevent groundwater use on the site.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy for the groundwater operable unit satisfies the statutory preference for treatment as a principal element of the remedy. Treatment is not employed for the sediment operable unit, but the remedy is consistent with other soil/sediment cleanups completed in Bloomington and the surrounding area.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure and it will take more than five years to attain remedial action objectives and cleanup levels, a policy review will be conducted within five years of construction completion for the site to ensure that the remedy is, or will be protective of human health and the environment.

RECORD OF DECISION AMENDMENT DATA CERTIFICATION CHECKLIST

The following information is included in the Decision summary section of the Record of Decision Amendment. Additional information can be found in the Administrative Record located at the Monroe County Public Library.

- Chemicals of concern and their respective concentrations are located on Pages 9, 10, 14, and 16.
- Baseline risks represented by the chemicals of concern are located on Pages 11 through 19.
- Cleanup levels established for chemicals of concern and the basis for these levels are located on Pages 19 and 20.

- Description of how source materials constituting principal threats are addressed is addressed on Page 40.
- Description of the current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD Amendment are located on Page 11.
- Description of the potential land and groundwater use that will be available at the site as a result of the implementation of the low flow collection system and sediment and soils cleanup is located on Page 35.
- Description of the estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected is located in Table 9.
- Description of the key factors that led to selecting the remedy is located on Page 40 and 41.

AUTHORIZING SIGNATURES AND SUPPORT AGENCY ACCEPTANCE OF REMEDY

The United States Environmental Protection Agency is the lead Agency for developing and preparing this Record of Decision Amendment. The State of Indiana, City of Bloomington, and Monroe County are signatories to the Consent Decree and those parties have all submitted letters of concurrence for the implementation of the above referenced alternative.

Richard C Karl

Richard C. Karl, Director
Superfund Division

9-25-07

Date

RECORD OF DECISION AMENDMENT
NEAL'S LANDFILL
OPERABLE UNITS 2 AND 3

SITE NAME, LOCATION, AND BRIEF DESCRIPTION

CBS Corporation (formerly known as Westinghouse Electric Corporation and Viacom Inc.) owned and operated a capacitor production facility in the City of Bloomington, Indiana. The insulating fluid used in the manufacture of the capacitors contained a polychlorinated biphenyl (PCB) dielectric fluid. PCBs are mixtures of up to 209 individual chlorinated compounds called congeners. Many commercial PCB mixtures are known in the United States as Aroclors.

Neal's Landfill began operation in 1950. Municipal and industrial wastes were deposited at the landfill until 1972. The landfill was originally known as Whitehall Pike Landfill and was later renamed Neal's Landfill after a former owner and operator. Municipal waste was the main type of refuse deposited at the landfill. Between 1958 and 1965, the landfill was expanded into topographic low areas adjacent to a central east-west oriented ridge. During 1966 and 1967, scrap and off-specification electrical capacitors from the Westinghouse plant in Bloomington were disposed of at the landfill along with PCB-contaminated capacitor parts, filter aids, and sawdust resulting in the release of PCB-contaminated dielectric fluids. The total volume of landfill material was approximately 320,000 cubic yards based on landfill borings completed in the 1980s.

Neal's Landfill is located approximately five miles due west of the City of Bloomington, Monroe County, Indiana (see Figure 1). The site consisted of approximately 18 acres that were used as an open dump and landfill on a larger property owned by a number of various parties. The most recent owner has passed away and the property, including the landfill, was bequeathed to the Sycamore Land Trust. The Sycamore Land Trust is currently determining if it is going to accept the property. State Route 48 is located approximately 800 feet directly south of the site. Access to the landfill is restricted by a security fence and private drive south from Vernal Pike.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Neal's Landfill was placed on the National Priorities List (NPL) in October 1981 and is one of the six sites addressed under the terms of a Consent Decree (CD) entered by the United States District Court for the Southern District of Indiana on August 22, 1985. The parties to the Consent Decree include the United States Environmental Protection Agency (U.S. EPA), Indiana Department of Environmental Management (IDEM), City of Bloomington, Monroe County, and CBS Corporation. The Consent Decree called for the construction of a permitted, Toxic Substances Control Act (TSCA) approved, dedicated, municipal solid waste-fired incinerator to be used to destroy PCB-contaminated soils and materials excavated from the six sites.

- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released.

The RAOs were developed for the purpose of developing an array of alternatives. Based upon the human health and ecological risk assessments, the remediation goals for the site will focus on fish tissue. Based upon the human health risk assessment, the remediation goals will be to reduce PCB concentrations to a level of 0.2 ppm in fillets within Richland Creek. This would allow a maximum of one meal of fish per week by all populations. The fish sampling location in Richland Creek at the State Route 48 and State Route 43 bridge, about 3 miles downstream from the site, will be used for future fish sampling since that location is capable of producing enough fish to support sport fishing.

Based upon the ecological risk assessment and using the mink as the target organism, Table 5 is a summary of the remediation goals based upon whole fish (assumes mink feeding 75% of the time in Richland Creek and 25% of the time in Conard's Branch). These PCB fish remediation goals are also protective of kingfisher.

Table 5 - Summary of Ecological PCB Remediation Goals

Location	PCB Remediation Goals (ppm)
Conard's Branch – Average whole fish concentration	1.8 to 2.3
Richland Creek at Vernal Pike – Average whole fish concentration	0.7 to 0.9

DESCRIPTION OF ALTERNATIVES

Groundwater and Sediment Operable Unit

Disposal of capacitors containing PCB oil and other PCB waste material from the former Westinghouse capacitor plant at Neal's Landfill have resulted in PCBs migrating deep into the karstic limestone bedrock. High concentrations of PCBs were discovered during the 1999 source control excavation in the southeast portion of the site. In addition, sampling of water and sediment during the 2005 cave entry showed PCBs in both the water and sediment. The southeast corner of the site and conduits that travel under the landfill hold a reservoir of potentially mobile PCBs. Numerous hydraulic tests show a direct connection between the conduits and the Northwest Spring System.

The karst conduit investigation indicates that the Northwest Spring System is the discharge point for an approximate 350 to 400-acre groundwater drainage basin. The spring system flows in direct response to rainfall and infiltration to the groundwater system within this area. U.S. EPA analyzed spring flow records and determined that the mean hourly spring flow for the Northwest Spring System is about 400 gpm. Although flow rates can be much lower than that in the summer months, peak flow rates during storm events can be higher than 11,000 gpm. PCBs are present in the Northwest Spring System discharge at all flow rates.

Before the 1999 source control cleanup, Neal's Landfill covered approximately 18 acres. The source control operable unit cleanup reduced the size of the landfill to approximately 10 acres. The 10-acre landfill only occupies a small portion of the approximately 400-acre Northwest Spring System drainage basin. The karst cave investigation and groundwater basin study has not demonstrated that clean water upgradient from the landfill can be diverted around the landfill. Moreover, PCBs in the karst bedrock cannot be effectively contained, removed, or treated by remedial action focused at the landfill. U.S. EPA concludes that the capture of PCBs at any point, or points, within the karst drainage system upstream from the Northwest Spring System is unlikely because of the inability to locate any major conduits where groundwater flows could be intercepted and diverted away from the contaminated areas under the landfill. Therefore, U.S. EPA's approach is to control PCBs released from the landfill by treating the discharge from the Northwest Spring System, which is the point where PCB-contaminated groundwater emerges from the groundwater system and flows into the headwaters of Conard's Branch.

The release of PCBs from Neal's Landfill has also contaminated sediment with PCBs in Conard's Branch and Richland Creek. Sediment contaminated with PCBs will affect the PCB levels in fish tissue. The sediment sampling results from Richland Creek show nearly all samples less than 1 ppm PCBs. Also, there is little or no sediment in Conard's Branch or Richland Creek until approximately 3 miles downstream of the landfill. Based upon the lack of sediment and the results of the human health and ecological risk assessments, no sediment cleanup was evaluated for Richland Creek. In Conard's Branch, in-stream sediment, bank soils and floodplain soils show a number of locations with PCB contamination greater than 1 ppm.

Fate and Transport Model

To assist in the development and evaluation of the alternatives for the groundwater and sediment operable units, CBS developed a PCB fate/transport and bioaccumulation model. The model was used to predict future levels of PCBs in fish in Conard's Branch and Richland Creek following the assumed implementation of a variety of different potential remedial action alternatives. As described in the Remedial Action Objectives section, the (1) remediation goal for human health is 0.2 ppm PCBs in fillets within Richland Creek and (2) ecological remediation goals are average whole fish concentrations in Conard's Branch of 1.8 to 2.3 ppm PCBs and average whole fish concentrations in Richland Creek of 0.7 to 0.9 ppm PCBs. These remediation goals were used in the fate and transport model to assist U.S. EPA in determining the best alternative to address the continuing release of PCBs from the Northwest Spring System.

Models have been used at a number of sites to assist the U.S. EPA in decision-making. The model developed by CBS relies upon various components that have been peer-reviewed by U.S. EPA in the past in connection with the cleanup of other sites. Models are a series of mathematical equations that describe the processes controlling contaminant exposure. For PCB exposure in a groundwater and surface water system like Neal's

Landfill, there are four groups of important processes that occur. The four sub-models or parts of the overall model are hydrodynamic, sediment transport, PCB fate, and PCB bioaccumulation. Data collected at the site, along with data from literature and experiences from modeling other systems, are used in the model to describe the Neal's Landfill groundwater and surface water system. To calibrate the model, extensive site-specific data such as sediment PCB concentrations, surface water flow data, PCB water sampling data obtained during storm and non-storm events, and fish and aquatic biota data were used to ensure that the model is as accurate as possible. The modeling effort provides valuable insights regarding the factors that control transport and fate of PCBs in Conard's Branch and Richland Creek.

The fate and transport model was used to quantify the relative importance of the various PCB sources to fish such as spring base flow, spring storm flow, water treatment plant effluent, in-stream sediments, and groundwater seeps along Conard's Branch. This type of assessment as to how each PCB source affects PCB concentrations in fish is helpful in developing and evaluating remedial alternatives. Table 6 below shows the results from the fate and transport model regarding the approximate contributions of spring water flow rates to PCB concentrations in fish.

Table 6 – Contribution of Water Sources to Fish PCBs Under Different Flow Regimes

Location	**Species**	**Conard's Branch Weir - Low Flow < 10 gpm**	**Conard's Branch Weir - Moderate Flow 10 to 500 gpm**	**Conard's Branch Weir - High Flow > 500 gpm**
Conard's Branch	Creek Chub	67%	22%	11%
Richland Creek at Vernal Pike	Creek Chub	42%	27%	31%
	Longear Sunfish	44%	27%	29%

Table 6 shows that the contributions of uncollected spring water flows to Conard's Branch when weir flows are less than 10 gpm provide the biggest source of PCBs to fish since these conditions are prevalent during the summer months when fish achieve much of their annual growth. High spring water flow conditions, and to a lesser extent, moderate spring water flow conditions contribute less PCBs to Conard's Branch fish since they are less frequent and last no longer than several days, which limits the ability of the fish to uptake the PCBs. In Richland Creek, low spring water flow conditions produce less of an effect on PCB levels in fish because the PCB concentrations in Richland Creek are diluted as compared to the PCB concentrations found in low-flow conditions at Conard's Branch.

In addition to evaluating how water flows influence PCB concentrations found in fish, the fate and transport model evaluated how the various sources of PCBs influence PCB concentrations in fish. Four sources of PCBs to fish were evaluated. The available PCB sources include (1) water that bypasses collection in Conard's Branch, (2) effluent from the current water treatment plant, (3) North Spring area seeps that bypass the current collection system, and (4) sediment. The seeps near North Spring were discovered through sampling within Conard's Branch. The sampling results in Conard's Branch showed that these seeps were not being collected by the North Spring collection system resulting in low levels of PCBs being untreated within Conard's Branch. Table 7 below shows the approximate contribution of sources to PCB levels in fish.

Table 7 – Approximate Contribution of Sources to PCB Levels in Fish

Location	Species	Water From Northwest Spring System	Effluent from Water Treatment Plant	North Spring Area Seeps Bypass Water	Sediments
Conard's Branch	Creek Chub	24%	11%	37%	27%
Richland Creek	Creek Chub	36%	8%	21%	35%
	Longear Sunfish	24%	6%	14%	56%

For example, Table 7 shows that the fate and transport model predicts that creek chub in Conard's Branch receive 24% of its PCBs from the water coming from the Northwest Spring System that bypasses collection, 11% of the PCBs from the effluent leaving the current water treatment plant, 37% of PCBs from the North Spring area seeps, and 27% of PCBs from the sediment in Conard's Branch.

To further evaluate the PCB sources, comparisons of PCB sources to water under both storm and low-flow conditions were also developed as shown in Figure 11. During storm flows, 98% of the PCBs in Conard's Branch are produced from the Northwest Spring System, 0.8% of PCBs to the water in Conard's Branch comes from the water treatment plant effluent, 1% of the PCBs to the water in Conard's Branch are from the North Spring area seeps, and 0.1% of the PCBs in Conard's Branch during storm events are from sediments in Conard's Branch. During low flow events, 9% of the PCBs to water in Conard's Branch come from the Northwest Spring System, 22% of the PCBs are from the water treatment plant effluent, 53% of the PCBs to water are from the North Spring area seeps and 16% of the PCBs to water in Conard's Branch come from the sediments.

Comparing Table 7 and Figure 11 shows that the source of PCBs in creek chubs within Conard's Branch are similar to the source of PCBs during low flow providing additional evidence that PCBs within Conard's Branch fish are controlled by low-flow PCB sources.

In summary, key findings of the fate and transport model are as follows:

- Storm events producing flows greater than 500 gpm do not produce a major effect on PCB levels in fish due to the large flows not producing a long period of exposure, which limits the PCB bioaccumulation in fish.

- PCB concentrations in fish are affected most by PCB-contaminated spring water during low-flow periods. Currently, 37% of the PCBs contributed to creek chub in Conard's Branch are from the North Spring area seeps which currently bypass collection.

- Sediment contamination and stream bank contamination in Conard's Branch have an effect on PCB levels in creek chub, with sediments and bank soils contributing 27% of the PCBs found in the fish.

Technical Impracticability Waiver

This Technical Impracticability (TI) Waiver relates only to the point source discharge at the point of water treatment prior to discharge to the creek during storm events. Since site investigations at Neal's Landfill have failed to define a plume in the karst geology and a definable plume does not appear to exist, it is not possible to set cleanup goals for the groundwater that would allow beneficial reuse consistent with CERCLA Section 121(d)(2)(A).

As described previously, disposal of capacitors containing PCB oil and other PCB waste material from the former Westinghouse capacitor plant at Neal's Landfill have resulted in PCBs migrating deep into the karstic limestone bedrock. During the 1999 source control operable unit, high concentrations of PCB-contaminated material were discovered during excavation of the southeast portion of the site, and many areas were excavated to bedrock due to these high concentrations. The southeast portion of the site is known from dye tracer testing to drain via a system of karst dissolution conduits to the Northwest Spring System. These conduits contain a mobile reservoir of PCBs that are released through the spring system. The Northwest Spring System is the discharge point for a groundwater drainage basin of approximately 400 acres. Spring flow is in direct response to rainfall and infiltration to the groundwater system within this area. Although the 10-acre landfill occupies only a small portion of this drainage area, it is located in the extreme downstream portion of the groundwater basin and in a position to contribute PCBs to the drainage from the entire area.

Experience has shown that conventional recovery-well systems typically utilized in porous media environments are not likely effective in recovery of contaminated groundwater in karst environments. Extensive site-specific investigations at Neal's Landfill have shown that it not is possible to isolate the drainage from the landfill area in a manner that would allow capture or treatment of only the landfill groundwater. Consequently, the upstream most recovery points for affected groundwater are the spring orifices. Control of the PCB releases to Conard's Branch must therefore involve control and treatment of the large volumes of Northwest Spring System flow.

Flow from the Northwest Spring System has been measured for many years, and since February 2001, the mean annual spring flow rate is about 400 gpm. Although flow rates can be much lower than that in the summer months, peak flow rates during storm events are routinely higher than 11,000 gpm and flows greater than 500 gpm can last for many days, depending on seasonal factors and the rainfall distribution.

Evaluating the flow data from the Northwest Spring System since February 2001 shows one particularly large flow event. For 21 days beginning on December 29, 2004, approximately 61.4 million gallons of water bypassed the 500 gpm water treatment plant. The 61.4 million gallons of water are equivalent to 188 acres of water, one foot in depth. To contain 61.4 million gallons of water for treatment would require a large number of storage tanks or a large lagoon. At the Illinois Central Spring water treatment plant, two storage tanks each store 600,000 gallons of stormwater. When flows are reduced from the spring, the water within the tanks is drained and treatment of the stormwater can occur. If the equivalent size storage tanks were used at Neal's Landfill for the Northwest Spring System, 102 storage tanks would be required. Construction costs of the tanks would be over $66 million dollars.

In contrast to storage tanks, a large lagoon was evaluated to store the stormwater from the Northwest Spring System. A lagoon storing stormwater 4 feet in depth would require 47 acres. The size of the lagoon could vary depending upon the depth of the water within the lagoon. For example, water 10 feet in depth would require a lagoon of approximately 19 acres to store the 61.4 million gallons of stormwater.

Constructing 102 storage tanks each capable of storing 600,000 gallons is not practicable due to the large area required to place the 102 storage tanks. More appropriate would be the use of a storage lagoon. If a 47-acre lagoon was used, the difficulty in finding the required space along with the construction difficulties due to the requirement of removing significant quantities of rock and ensuring the containment of the water make constructing a large lagoon technically impracticable from an engineering perspective. Another problem with addressing such a large volume of water is the time required to treat the stored water. Assuming the 500 gpm water treatment plant is treating 100 gpm from the Northwest Spring System and 400 gpm from the storage lagoon, it would require 106 days to drain. This timeframe would produce additional storms so the likelihood that the lagoon would be consistently filled with water is high. This lagoon would be an attractive nuisance to both humans and ecological receptors. Ecological receptors such as geese and ducks using the storage lagoon would be exposed to PCB-contaminated water at higher concentrations compared to Richland Creek or Conard's Branch.

Taking into consideration the limitations of the site available to construct the storage areas and the impediments to keeping the unit operational under such conditions, the U.S. EPA is exercising a TI waiver of the National Pollution Discharge Elimination System (NPDES) substantive requirements for stormwater flow greater than 500 gpm that bypasses the water treatment plant.

The TI waiver applies to all the alternatives and is being implemented under CERCLA Section 121(d)(4)(C) which is technical impracticability from an engineering perspective. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) waived are discussed in the Evaluation Criteria for Superfund Remedial ARARs section.

Remedy Components

After evaluating the PCB sources to water and fish, remedial alternatives were developed to address the unacceptable ecological and human health risk. The alternatives were evaluated in the fate and transport model to determine if the PCB risk goals developed for fish (See Remedial Action Objectives Section) could be met. Including the "No Action Alternative," U.S. EPA evaluated seven alternatives to address contaminated groundwater and sediment caused by Neal's Landfill. The No Action Alternative must be evaluated as part of all Superfund remedy decisions. Under U.S. EPA's regulations, the "No Action Alternative" can include continuation of interim remedial measures, such as the continued operation of the water treatment plant built as an interim measure under the 1985 Consent Decree. Nevertheless, U.S. EPA also considered the alternative of shutting off this water treatment plant.

The development of the alternatives took into consideration the continued use of the current 450 gpm water treatment plant, which can treat up to 500 gpm. Due to the technical impracticability of storing all the stormwater that bypasses the water treatment plant, storage of a smaller amount of stormwater was evaluated.

Seven alternatives were developed based upon the ability to address springs at base flow, springs at storm flow, the North Spring area seeps and sediment. U.S. EPA did evaluate the possibility of capturing a smaller volume of stormwater compared to storing all of the stormwater. A storage volume of 2 million gallons was evaluated in the fate and transport model. These seven alternatives were evaluated in detail in the fate and transport model and are as follows:

- Alternative 1- No Action (this Alternative would shut down the current 500 gpm treatment system).

- Alternative 2 – Continue to operate the 500 gpm water treatment plant.

- Alternative 3 – Continue to operate the 500 gpm water treatment plant with improvements to the water collection system, and perform a sediment and floodplain cleanup in Conard's Branch.

- Alternative 4 – Continue to operate the 500 gpm water treatment plant, add 2 million gallons of stormwater storage, improve the water collection system, and perform a sediment and floodplain cleanup in Conard's Branch.

- Alternative 5 – Expand the current water treatment plant to 1,000 gpm, improve the water collection system, and perform a sediment and floodplain cleanup in Conard's Branch.

- Alternative 6 - Expand the current water treatment plant to 1,000 gpm, add 2 million gallons of stormwater storage, improve the water collection system, and perform a sediment and floodplain cleanup in Conard's Branch.

- Alternative 7 – Continue to operate the 500 gpm water treatment plant, improve the water collection system, add three stormwater settling basins, and perform a sediment and floodplain cleanup in Conard's Branch.

The seven alternatives were each evaluated in the fate and transport model to determine if the fish goals would be met if the alternative was implemented. Table 8 shows the expected percentage of PCB reduction in fish concentrations predicted by the model for each of the seven alternatives 10 years after the implementation of the alternative.
As described in the Remedial Action Objectives section, the objectives of the groundwater and sediment operable units are to reduce the amount of PCBs that are released in Conard's Branch and Richland Creek and to meet the remediation goals developed for fish tissue in the ecological and human health risk assessments. The fate and transport model predicts that spring water during storm events, which is not currently captured for treatment by the existing water treatment plant, does not have an unacceptable effect on PCB fish-tissue levels. It appears that the PCB-contaminated water released during storm events has little effect on fish because the duration of the conditions during storms does not produce a long enough exposure to greatly affect the PCB concentrations in fish. For Alternatives 3 through 7, the model predicts that the fish tissue remediation goals for both ecological and human health will be met within 10 years after the remedy is constructed.

Table 8 – Percent Reduction in PCB Levels in Fish Tissue After 10 Years

Alternative	Description of Alternative	% Reduction Year 10 Average Conard's Branch Creek Chub	% Reduction Year 10 Average Richland Creek Creek Chub	% Reduction Year 10 Average Richland Creek Longear Sunfish
1	No Action	0%	0%	0%
2	Current 500 gpm Treatment System	69%	63%	51%
3	Water Collection System Improvement + Sediment Cleanup to 1 ppm PCBs + 500 gpm Treatment System	83%	69%	56%
4	Water Collection System Improvement + Sediment Cleanup to 1 ppm PCBs + 500 gpm Treatment System + 2 Mgal Storage	83%	71%	57%

Alternative	Description of Alternative	% Reduction Year 10 Average Conard's Branch Creek Chub	% Reduction Year 10 Average Richland Creek Creek Chub	% Reduction Year 10 Average Richland Creek Longear Sunfish
5	Water Collection System Improvement + Sediment Cleanup to 1 ppm PCBs + 1000 gpm Treatment System	86%	74%	60%
6	Water Collection System Improvement + Sediment Cleanup to 1 ppm PCBs + 1000 gpm Treatment System + 2 Mgal Storage	86%	75%	60%
7	Water Collection System Improvement + Sediment Cleanup to 1 ppm PCBs + 500 gpm treatment System + 3 Settling Basins	85%	74%	60%

PCB-contaminated sediment contributes approximately 27% of the PCBs in fish tissue within Conard's Branch; therefore, addressing PCB-contaminated sediment is critical to meeting the fish goals. Accordingly, U.S. EPA evaluated only leaving the sediment in place (No Action Alternative) and the removal of PCB-contaminated in-stream and bank sediment to 1 ppm PCBs on average, along with removal of floodplain soils to 5 ppm PCBs on average for Alternatives 3 through 7.

The estimated volume of PCB-contaminated sediment and soils is 1,141 cubic yards using the cleanup criteria for sediment, banks, and floodplain. CBS will take the excavated sediment and soils for off-site disposal in permitted landfills capable of accepting PCB-contaminated material. If PCB concentrations are less than or equal to 50 ppm PCBs, then the PCB-contaminated material will be disposed of in a special waste landfill. If sediments and soils are contaminated with concentrations of greater than 50 ppm PCBs, then a TSCA chemical waste landfill will be used for disposal. For costing purposes, U.S. EPA assumed that 100 tons of the sediments and soils are contaminated with greater than 50 ppm PCBs. Additional sampling to supplement historical sediment sampling data will be required prior to beginning the cleanup activities. It is estimated that remediation of the sediment, banks and floodplain soils will cost $1,184,109.

Below are descriptions of the Alternatives evaluated for the groundwater and sediment operable units. Costs are calculated using present worth, because this indicates how much money will need to be available today to completely fund the construction and operation and maintenance. To calculate the present worth, a 7% discount rate was used and a timeframe of 30 years of operation. The 30 years of operation and maintenance is used only for the purpose of estimating cost. The actual operation and maintenance period may be longer than 30 years or may be shorter.